

AMENDMENTSIn the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-23 (canceled).

Claim 24 (currently amended) A method to form a gate-controlled, BTBBI transit diode device in the manufacture of an integrated circuit device comprising:

providing a semiconductor layer in a substrate;

implanting ions into said semiconductor layer to form an emitter region;

implanting ions into said semiconductor layer to form a barrier region;

forming an insulator layer overlying said semiconductor layer;

depositing a conductor layer overlying said insulator layer;

patterning said conductor layer to form a gate wherein said gate overlies said barrier region and at least a part of said emitter region; and

thereafter implanting ions into said semiconductor layer to form a collector region and to complete said diode device in the manufacture of said integrated circuit device wherein a drift region is formed in said semiconductor layer where said gate overlies said semiconductor between said collector region and said barrier region.

Claim 25 (original) The method according to Claim 24 wherein said step of implanting ions into said semiconductor layer to form an emitter region comprises arsenic ions, where said step of implanting ions into said semiconductor layer to form a barrier region comprises boron

ions, and where each said steps are performed using common masking layer and a common annealing process.

Claim 26 (original) The method according to Claim 24 wherein said semiconductor layer comprises silicon.

Claim 27 (original) The method according to Claim 24 further comprising forming a buried insulator layer overlying said substrate prior to said step providing a semiconductor layer overlying said substrate.

Claim 28 (original) The method according to Claim 24 wherein said semiconductor layer comprises one of the group of: n-type doped and p-type doped.

Claim 29 (currently amended) The method according to Claim 24 wherein ~~said~~ said emitter region is n-type, said barrier region is p-type, and said collector region is p-type.

Claim 30 (original) The method according to Claim 24 wherein said emitter region is p-type, said barrier region is n-type, and said collector is n-type.

Claim 31 (original) The method according to Claim 24 wherein said conductor layer consist of one of the group of: polysilicon, metals, metal silicide, metal nitrides, and combination thereof.

Claim 32 (original) The method according to Claim 24 wherein said insulator region consist of one of the groups of: oxide, silicon oxide, silicon oxynitride, silicon nitride, tantalum oxide, and aluminum oxide.

Claim 33 (new) A method to form a gate-controlled, BBT transit diode device in the manufacture of an integrated circuit device comprising:

providing a semiconductor layer in a substrate;

forming an emitter region and a barrier region in said semiconductor layer by implanting ions into said semiconductor layer with a common masking layer and performing a common annealing process;

forming an insulator layer overlying said semiconductor layer;

depositing a conductor layer overlying said insulator layer;

patterning said conductor layer to form a gate wherein said gate overlies said barrier region and at least a part of said emitter region; and

thereafter implanting ions into said semiconductor layer to form a collector region and to complete said diode device in the manufacture of said integrated circuit device wherein a drift region is formed in said semiconductor layer where said gate overlies said semiconductor between said collector region and said barrier region.

Claim 34 (new) The method according to Claim 33 wherein said step of forming said emitter region and said barrier region in said semiconductor layer comprises implanting arsenic ion for said emitter region and implanting boron ions for said barrier region.